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THE NEW ENTOMOLOGICAL LABORATORY OF THE CALIFORNIA ACADEMY OF SCIENCES

BY E. P. VAN DUZEE, CURATOR

The new rooms of the Department of Entomology are on the second floor of the recently completed east wing of the buildings of the California Academy of Sciences. The accompanying cuts will give an idea of these new rooms. They occupy a space 30 feet by 137 feet, or a little more than 4000 square feet of floor space against 864 square feet in the former room in the west wing. Entrance to the new rooms is through the office of the department, at the west end. This office is twenty by thirty feet in size and contains, besides the desks of the curator, secretary, and of the treasurer of the PAN-PACIFIC ENTOMOLOGIST, the type cases, the curator's library on Hemiptera, a catalogue case, one for blanks and records and the Gunn Memorial collection of Lepidoptera for the use of beginners.

Opening from the office is the large laboratory thirty by seventy-five feet in size. This laboratory has been divided by rows of cases into three compartments or alcoves with a broad path or aisle down the middle. The first of these alcoves is devoted to the Lepidoptera, the second to the Hemiptera on one side and a store room for supplies and accumulated material on the other side, the third alcove contains the Diptera, Hymenoptera, Orthoptera and the Neuropteroid orders. Beyond these at the east end is the Coleoptera room, thirty by thirty-seven feet in size, with a laboratory desk across one end. In the larger laboratory each alcove is arranged for a row of cases along each side and a double row through the center. Alternating with these rows of cases are study tables three by nine feet in size with wall plugs for table light connections opposite each table. A skylight over each table gives ample daylight for all purposes. Books on each order of insects are shelved

in the alcove with the insects of that order, the general entomological books and periodicals are shelved along the aisle in the middle section, against the store room.

The insect cases used are of two kinds: Twenty-one pine cases twenty-nine inches wide by six feet four inches high and fifty-two metal cases three feet five inches wide by three feet high; all cases are twenty inches deep. Eleven of the pine cases have thirty-six three-inch drawers, each just twice the size of the standard Schmidt box, the other ten cases have forty-two two and one-half-inch drawers of the same size, making 816 drawers of that size. The metal cases have twenty-four drawers seventeen by nineteen inches in size, making 1248 of that style, or 2064 drawers in all. All drawers used for butterflies have the bottom as well as the top of glass, the specimens being pinned on quarter-inch cork strips. Drawers for the Odonata, Orthoptera and the moths have cork-lined or masonite bottoms. Insects of other orders are kept in "unit" boxes in drawers with wooden bottoms. The unit boxes used by the Academy are three by three and one-half inches in size with double units for larger series and half and quarter units for smaller series. Brief specications and drawings showing the construction of these metal covered cases were published in *Museum News*, Vol. VIII, No. 3, pp. 11 to 12, June, 1930.

A short sketch of the history of this department may not be out of place here. In 1862 the Council of the Academy felt that the work of the Academy could best be carried on under a departmental arrangement and three such departments were then established, one of which was Entomology, with Dr. Herman Behr as curator, a position he held until 1867. Mr. Richard H. Stretch was curator from 1868 to 1880, when Dr. Behr again took over the duties, continuing as curator until his death in 1904, when Dr. E. C. Van Dyke took up the work and carried it on until the appointment of the present curator in 1916. In the conflagration of 1906 the entire collection of the Academy was destroyed save only eight boxes containing the material from Lower California that had been studied by Dr. Horn, Dr. Uhler, Mr. Fox, Mr. Ashmead and Mr. Pergande. These precious types were saved by the energetic efforts of Miss Alice Eastwood, curator of botany, Miss

Hyde, librarian, and Mr. John Carleson, caretaker of the Academy. They were moved ahead of the fire three times and finally found a safe temporary asylum at Fort Mason. They now form a much-prized unit in the Academy's collection of insect types.

After the fire the return of the Academy expedition from the Galapagos Islands brought 4000 insects, the nucleus of the present collection. In 1908 Mr. J. G. Grundell gave his collection of Lepidoptera, largely exotic butterflies. A little later the W. G. Wright collection was received, the most valuable portion of which was the plesiotypes of all the butterflies figured in his Butterflies of the West Coast, quite a number of which are the true types of new species established in that work. In the meantime the Academy had secured many valuable oriental species taken by Dr. J. G. Thompson and others, and Dr. Van Dyke had been adding the numerous insects other than Coleoptera taken by him in his field work as had Mr. J. R. Slevin. Probably 30,000 specimens had been accumulated when the present curator took over the care of this department in 1916. Since that date a number of large and valuable collections have been received. In 1916 Mr. E. J. Newcomer gave us his collection of nearly 2000 butterflies. The next year Dr. F. X. Williams gave us his collection of about 8000 insects, mostly Lepidoptera and especially strong in diurnals. The year following the R. H. Stretch collection of Bombycine moths, over 3000 specimens, was turned over to the Academy for safe keeping. In 1924 the Academy received by bequest the Holbrook collection of butterflies with money for its proper display as an exhibition. That same year Dr. E. C. Van Dyke deeded to the Academy his great collection of Coleoptera of nearly 200,000 specimens, the largest on the coast. The year following Dr. F. E. Blaisdell deeded his collection of Coleoptera, but little smaller than the Van Dyke collection, and the curator turned over his collection of Hemiptera numbering about 30,000 specimens. These three collections and some others received later were accepted with the understanding that, although the property of the Academy, the donor should retain control of them through his lifetime. In 1926 the Albert Koebele collection came to the Academy through the kind offices of Mr. W. M.

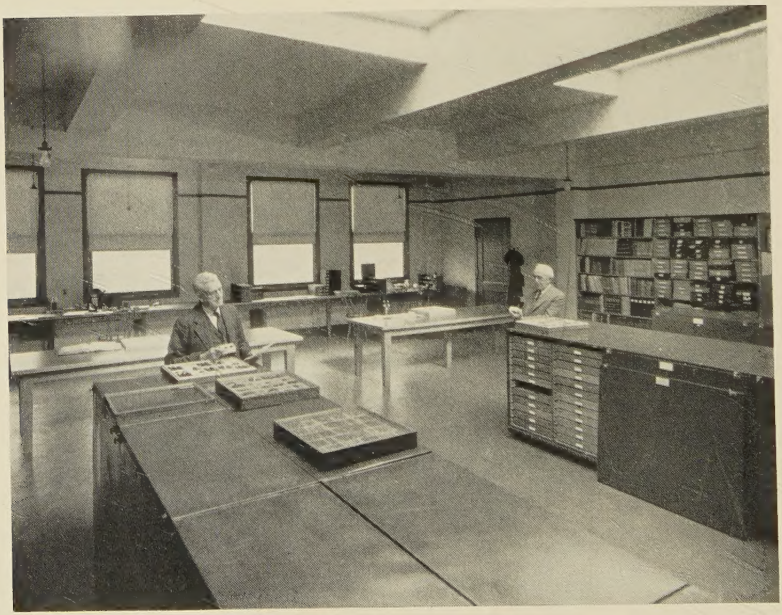
Giffard of Honolulu and the generosity of Mrs. Fanny Koebele. This collection was especially strong in the moths, scale insects and Coccinellidæ. In 1927 Mr. Louis Slevin presented his collection of Coleoptera, about 25,000 specimens, and has made large additions to it since. In 1928 the Academy received by bequest the C. L. Fox collection of Hymenoptera and Mr. J. O. Martin presented the Academy with his collection of Coleoptera, about 12,000 specimens. More recently the M. C. Van Duzee collection, mostly Diptera, has been added. This collection of Diptera will give the Academy the eastern species we needed and is especially rich in families not usually favored by collectors, such as the Dolochopodidæ, Tipulidæ and Mycetophylidæ, and added types of 142 species of Diptera. Mr. Van Duzee is still improving the collection by study and determination of the material in certain families.

Large additions to the Academy collection of insects have been made during the past fifteen years by expeditions, mostly by the curator or by Dr. E. C. Van Dyke. Some of the more productive of these are the following by the department staff: 1918, to northern California, 1919 to Huntington Lake, California, 1920 to western Washington and Vancouver Island, 1921 to the Gulf of California, 1922 to Utah, 1924 to Arizona, 1927 to Truckee and Reno, and 1929 to Owens Valley, each of these adding from five to fifteen thousand specimens. Dr. E. C. Van Dyke has made large additions to our collections each year, usually 2000 or more specimens, but most valuable of all his annual additions was the series of about 20,000 insects from China and Japan, taken by him in 1923.

Altogether the Academy now has in its cases about 880,000 specimens of mounted insects, all but about 40,000 being actual count as the material came in. A large proportion of this material in most of the insect orders is determined, largely by specialists, and is being arranged in systematic order as rapidly as time and the acquisition of the necessary cases will permit. The Hymenoptera alone of the larger orders is still but partially studied. It is the aim of the Academy to build up a large reference collection of insects where our west coast students can come to do monographic work on any group in which they may be interested. Heretofore no large general collection of

Main Laboratory, Looking from Office Door; Curator at Left

Office of Department of Entomology



Coleoptera Laboratory
Dr. F. E. Blaisdell (*left*) *and* J. O. Martin

insects has been available west of the Atlantic States. With the loyal support of the members and friends of the Academy it will soon have a collection second to none, excepting that at the National Museum and possibly one or two others in the east. The Trustees and Council of the Academy have done their part in furnishing one of the best equipped entomological laboratories in the country. It is now up to our entomologists to build up and perfect such a collection as has been envisioned by the officers of the Academy.

Numbering Types

Different institutions and different departments in other institutions use different methods in recording their type numbers. Some use "lot" numbers while others employ "specimen" numbers in groups where each specimen receives a serial number. There are about as many schemes for numbering specimens as there are institutions that have adopted such a system. In all such institutions type numbers run into high figures, even where there are but few type specimens, hence the type numbers give no clue to the number of types in that institution.

Where special type numbers are used there still may be a great difference in the method of applying them. Some number paratypes among the types or even topotypes, thus greatly increasing the number of types. In the Department of Entomology at the California Academy of Sciences we give type numbers to holotypes (including lectotypes) and allotypes only. Such type numbers now run to 3,614, representing 2,440 species of which the Academy possesses the holotype or allotype. These holotypes and allotypes are segregated and are kept in metal cases in the Department office. They are numbered serially as received and are entered in a record book with full data. A species index on cards makes it possible to locate a type at once. Paratypes and cotypes are not numbered and are kept in the general collection, but of course, are designated by a special paratype label.—E. P. Van Duzee.

A PRELIMINARY CATALOGUE OF THE CHRYSOMELIDÆ OF OREGON

BY MELVILLE H. HATCH AND SAMUEL BELLER

The following list of Chrysomelidæ from Oregon contains ninety-one species and two varieties. Of these, forty-nine species and one variety are represented in the collection of the Oregon State Agricultural College, very kindly loaned to us by Professor W. J. Chamberlin of that institution; three species were added by Mr. L. G. Gentner of the Southern Oregon Experiment Station, to whom we are indebted for permission to incorporate these and other records; one species and one variety were added by specimens in the collection of the senior author; thirty-eight species and one variety were added from the literature. In a concluding paragraph ten species and two varieties are listed that occur both in Washington and in California and, consequently, are very probably members of the Oregon fauna. This gives a total of 101 species and four varieties, which probably represents ninety per cent or more of the Chrysomelidæ inhabiting the state.

In the list, localities without qualification are represented by specimens in the collection of the Oregon State Agricultural College; localities followed by the citation "(Hatch)" or "(Kincaid)" are represented by specimens in the collection of the senior author; localities taken from the literature bear a bibliographic citation; localities included on the authority of Professor Chamberlin or Mr. Gentner are so marked, specimens representing the latter being in Mr. Gentner's collection. The sequence of species is that of Leng, Cat. Col. Amer. n. of Mex. 1920, and the numbers preceding the species are the serial numbers employed in that catalogue.

15194 *Donacia hirticollis* Kby. Blue Mountains (Tollgate 5000 feet) (M. C. Lane), Klamath County (Lake of the Woods).

15196 *D. pubescens* Lec. (Schaeffer, Brook. Mus. Sci., Bull. III, 1925, p. 91).

15216 *D. (Plateumaris) emarginata* Kby. Mount Jefferson.

——— *D. (P.) germari* var. *flavipennis* Mann. Dilley (Schaeffer, l. c., p. 142).

15213a *D. (P.) pusilla* var. *pyritosa* Lec. Corvallis (Kincaid), Steins Mountains.

—— *D. (P.) longicollis* Schaeffer. Corvallis (Kincaid), Hood River (Schaeffer, l. c., p. 157).

15219 *Orsodacne atra* Ahr. Steins Mountains. Represented by the following varieties: Var. B, black, base of femora pale; Var. T, pale with sutural and side margins of elytra narrowly black; Var. Y, pale with apex of elytra dark; Var. Z, as in "T" with pronotum dark.

15220 *Syneta carinata* Mann. (Bristley, Pan-Pac. Ent. IV, 1927, p. 59).

15221 *S. simplex* Lec. (Leng, Cat. Col., 1920, p. 287).

15222 *S. hamata* Horn. Blue Mountains (Anthony L.), Bellfontain, Corvallis, Klamath County, La Grande, Mary's Peak, Waldport.

15224 *S. albida* Lec. Corvallis, Waldport.

15229 *Zeugophora scutellaris* Suffr. (Bristley, l. c., p. 115).

15231 *Z. californica* Cr. (Leng, l. c., p. 287).

15234 *Crioceris asparagi* L. ab. *linnei* Pic. Gresham, Hermiston.

15287 *Saxinis saucia* Lec. Ashland, Klamath Falls, Oregon Mountains (Josephine County), Siskiyou Pass (Jackson County), Sparta (Baker County).

15392 *Pachybrachis melanostictus* Suffr. Portland and Huntington (Fall, Trans. Am. Ent. Soc., XLI, 1915, p. 398).

15393 *P. peccans* Suffr. Huntington (Fall, l. c., p. 400).

15440 *P. bivittatus* Say. Huntington (Fall, l. c., p. 449).

15442 *P. circumcintus* Cr. Hood River and Josephine County (Fall, l. c., p. 450).

15452 *P. præclarus* Weise. Jackson County. The three specimens at hand differ from typical *præclarus* by having the anterior margins of the pronotum and elytra narrowly pale, the pronotum with a median pale vitta at the anterior half and a pair of divergent pale vittæ at the base, one on either side of the middle.

15481 *Cryptocephalus sanguinicollis* Suffr. La Grande. Var. *nigerrimus* Cr. (Leng, l. c., p. 291).

15521 *Diachus auratus* Fab. Corvallis, Monroe (Hatch).

15560 *Colaspis oregonensis* Cr. (Leng, l. c., p. 292).

15604b *Adoxus obscurus* var. *villosulus* Schrank. Alsea Mountain, Crater L., Portland, Three Sisters, Valsetz.

15612 *Glyptoscelis illustris* Cr. (Leng, l. c., p. 293).

15616 *G. alternata* Cr. Crane, Steins Mountains (Fish L.), Wild Horse.

15617 *G. albida* Lec. Klamath County.

15619 *G. squamulata* Cr. (Leng, l. c., p. 293).

15628 *Chrysochus auratus* subsp. *cobaltinus* Lec. Dalles, Gold Hill, Medford.

15633 *Timarcha intricata* Hald. Corvallis, Portland.

15636 *Hydrothassa vittata* Oliv. (Leng, l. c., p. 294).

15648 *Leptinotarsa decemlineata* Say. Richland.

15669 *Calligrapha elegans* Oliv. Portland.

15676 *C. multipunctata* Say. Hermiston.

15677 *C. bigsbyana* Kby. (Leng, l. c., p. 295).

15680 *C. sigmoidea* Lec. Corvallis.

15687 *Chrysolina basilaris* Say. Baker.

15695 *Phædon prasinella* Lec. (Leng, l. c., p. 295).

15702 *Gastroidea dissimilis* Say. Corvallis, Medford, Portland, Salem.

20190½ *Chrysomela immaculata* Schaeffer (Schaeffer, Can. Ent., LX, 1928, p. 45).

15708 *C. interrupta* Fab. Alsea Mount, Dalles: forms with all spots discrete and with the two subapical spots confluent. Var. *ænicollis* Schaeffer. Corvallis, Crater L.: form with elytra black with eight to ten more or less isolated pale spots. The var. *ænicollis* is represented by the Corvallis and Crater L. specimens.—M. H. H.

15710 *C. lineatopunctata* Forst. Corvallis (Kincaid); var. *confluens* Rogers. Crane, form with black elytra.

15727 *Trirhabda canadensis* Kby. Baker, Corvallis, Enterprize, Medford, Union County.

15736 *T. flavolimbata* Mann. Southern Oregon (Horn, Trans. Am. Ent. Soc., XX, 1893, p. 73).

15751 *Galerucella nymphæ* L. Lake of Woods (Klamath County).

15753a *G. decora* subsp. *carbo* Lec. Portland.

——— *G. spiræophila* sp. nov. Astoria, Corvallis, Klamath County, Monroe (Hatch), Summit (Benton County), Upper Klamath Marsh.

15754 *G. luteola* Mull. Corvallis.

15756 *Monoxia consputa* Lec. Crater Lake, Klamath Falls, Silver Lake, Tumalo.

15757 *M. debilis* Lec. Corvallis, Crater Lake, Eugene (Hatch), Harney Lake (Harney County), Klamath Falls, McMinnville, Monroe (Hatch), Phœnix, Tumalo.

15759 *M. sordida* Lec. Crater Lake, Klamath County.

15770 *Diabrotica soror* Lec. Canyonville (Hatch), Corvallis, Cottage Grove (Hatch).

15783 *D. trivittata* Fab. Alsea, Corvallis.

15785 *Phyllobrotica luperina* Lec. Corvallis and Pratum (Chamberlin).

15802 *Scelolyperus schwarzi* Horn. Hood River (Horn, l. c., p. 106).

15803 *S. longulus* Lec. (Leng, l. c., p. 297).

15830 *Luperus varipes* Lec. Drake Peak (Lake County).

15852 *Galeruca externa* Say. Mount Hood (Cloud Cap Inn).

15861 *Hypolampsis pilosa* Ill. (Leng, l. c., p. 299).

15895 *Disonycha uniguttata* Say. Elgin.

——— *D. nigriventris* Schaeffer. Blitzen River (Schaeffer, Jour. N. Y. Ent. Soc., XXXIX, 1931, p. 282).

——— *D. latiovittata* sp. nov. *Haltica puncticollis* Lec. (nec Kby. 1837), which is probably the same as this new species, was described from Oregon and California. Mr. Gentner reports specimens that he assigns to Leconte's species from Grants Pass.

——— *D. neglecta* Schaeffer (Schaeffer, l. c., p. 284).

15906 *D. triangulari* Say. Ontario.

15916 *Altica bimarginata* Say. Ashland (Gentner), Corvallis, Dodge Park (Gentner), Veronia (Gentner).

15929 *A. probata* Fall (det. by Gentner). Corvallis.

15939 *A. aruginosa* Lec. (Leng, l. c., p. 300).

15943 *A. tombacina* Mann. (*evicta* Lec.) (det. by Gentner). Astoria (Lovett-Gentner), Dodson (Carl D. Duncan-Gentner), McKenzie Pass (Hatch), Monroe (Hatch), Polk County, Portland, Valsetz.

15945 *A. tincta* Lec. (det. by Gentner). Ashland, Elgin, Klamath County (Pelican Bay).

15968 *Chalcoides helxines* L. Corvallis, Sparta (Baker Co.), Upper Klamath Marsh (Lovett-Gentner).

15977 *Hippuriphila modeeri* L. (Leng, l. c., p. 301).

15985 *Epitrix subcrinita* Lec. Corvallis, Portland (Gentner), Talent (Gentner).

15990 *Leptotrix recticollis* Lec. (Leng, l. c., p. 301).

15995 *Chætocnema cribrata* Lec. (Horn, l. c., XVI, 1889, p. 257).

15997 *C. irregularis* Lec. Warner Mountains (Lake County), (Gentner).

16028 *Systena tæniata* Say. Ontario.

16035 *Longitarsus oregonensis* Horn. (Leng, l. c., p. 302).

16067 *Phyllotreta oregonensis* Cr. (Leng, l. c., p. 302).

20245 J. *utana* Chittn. Corvallis and Forest Grove (Chittenden, Ent. Amer., VIII, 1927, p. 22).

—— *P. vitta* var. *lineolata* Chittn. Corvallis (Chittenden, l. c., p. 25).

—— *P. perspicua* Chitt. Klamath Lake (Chittenden, l. c., p. 29).

16069 *P. denticornis* Horn. Dalles and Hood River (Chittenden, l. c., p. 35).

16071 *P. decipiens* Horn. Portland (Chittenden, l. c., p. 37).

16072 *P. albionica* Lec. Dalles and Huntington (Chittenden, l. c., p. 39).

16077 *P. lewisi* Cr. Dalles and Ontario (Chittenden, l. c., p. 46).

—— *P. polita* Chittn. Corvallis (Chittenden, l. c., p. 57).

16089 *Psylliodes punctulata* Melsh. Corvallis (Gentner), Elgin, Talent (Narrows) (Gentner).

16090 *P. convexior* Lec. Talent (Gentner).

16096 *Anisostena nigrita* Oliv. Elgin.

16129a *Microrphopala vittata* var. *lætula* Lec. (Leng, l. c., p. 303).

16149 *Jonthonota nigripes* Oliv. Corvallis, Hermiston.

The following ten species and two varieties have a Washington and California distribution and probably occur in Oregon: *Zeugophora abnormis* Lec., *Z. varians* Cr., *Pachybrachis donneri* Cr., *Adoxus obscurus* L. typical form, *Phædon prasinella* var. *punctatus* Hatch, *P. oviformis* Lec., *Disonycha pluriligata* Lec. (*quinquevittata* Say nec Fab.), *Epitrix cucumeris* Harr., *Mantura floridana* Cr., *Phyllotreta pusilla* Horn, *Dibolia ovata* Lec., *Chelymorpha cassidea* Fab.

Galerucella (s. str.) **spiræophila** Hatch, sp. nov.

Dull yellowish brown with antennæ, occiput, three spots on pronotum, and ventral surface of body except extreme apex of last segment black; pronotum more or less densely and regularly punctate with small impunctate areas toward the anterior angles; elytra evidently pubescent, evidently punctate with the intervals between the punctæ nearly smooth, sutural angles rounded; mesocoxæ nearly contiguous; fifth abdominal sternite in male deeply emarginate, the emargination extending nearly three-fourths the total length of the segment, in female more or less notched at apex; length 5 mm.

Type, allotype, and fifty paratypes, Chase Lake (Snohomish County), Washington, April 30, 1931, M. H. Hatch; 9 paratypes, Seattle, Washington, August 17, 1928; 1 paratype, Seattle, Washington, April 26, 1928; 4 paratypes, Evans Creek (King County), May 11, 1929, M. H. Hatch; 1 paratype, Snoqualmie Falls, May 10, 1930, M. H. Hatch; 1 paratype, Lopez Island, Washington, July 3, 1926; 4 paratypes, Leavenworth, Washington, June 29, 1931, R. W. Kiser; 1 paratype, Monroe, Oregon, June 18, 1930, all in Hatch collection. Two paratypes, Mount Adams, Washington, July 1, 1925, M. C. Lane, and Toppenish, Washington, May 15 1926, M. C. Lane (in his collection). Five paratypes, Astoria, Oregon, January 1, 1922, A. L. Lovett; 3 paratypes, Summit, Oregon, July 5, 1929, A. L. Lovett; 1 paratype, Corvallis, Oregon, May 15, 1925; 1 paratype, Yakima, Washington, July 26, 1922, A. L. Lovett, all in collection of Oregon State Agricultural College.

The series from Chase Lake was taken on *Spiræa douglasii*.

This form is morphologically very close to *decora* Say, and may prove to be only a variety or subspecies of it. In view, however, of its distinct food plant (*decora* feeds on *Salix*), it would seem best to keep them apart. In addition, in *spiræ-*

ophila, the base of the head is somewhat more narrowly dark, the apex of the last abdominal segment somewhat more narrowly pale and somewhat more strongly notched in the female.

The food plant is known only for the specimens from Chase Lake. All captures of *Galerucella* should be accompanied by a notation of food plant, since Fall (Me. Agric. Exp. Sta., Bull. 319, 1924, pp. 81-91) has shown this to be frequently of great taxonomic significance.

Disonycha latiovittata Hatch, sp. nov.

Elongate, subparallel; head pale with narrow occipital margin, labium, and two more or less coalescent spots on front (which may be obsolete) black; pronotum with from two to five black spots, evidently punctate; elytra yellow with a common sutural, a discal, and a marginal dark vitta; the marginal and sutural vittæ meeting at apex, the discal vitta free at apex and as wide or wider than pale vittæ on either side; below pale except for tibiæ, tarsi, and more or less restricted areas on the meso- and metathorax, which are black; length 7-8 mm.

Type and five paratypes, Nisqually, Washington, August 23, 1931, collected on *Salix* by Trevor Kincaid; one paratype, Sultan, Washington, May 13, 1931, D. Frizzell, all in Hatch collection. Eight paratypes, North Yakima, Washington, July 10, 1903 (two in Hatch collection); and one paratype, Wawawai, Washington, in collection of State College of Washington. Three paratypes, one each from Perry, Washington, June 17, 1923; Kettle River, Orient, Washington, July 8, 1921, and Wawawai, Washington, May 31, 1921, collected by M. C. Lane, and in his collection. One paratype, Gallatin County, Montana, July 12, No. 1305 (in University of Montana collection).

Distinguished from *pluriligata* Lec. (*quinquevittata* Say *nec* Fab.) by the discal black vitta being as wide or wider than the pale vittæ on either side, by the more coarsely punctate pronotum, by the more constant quinquemaculation of the pronotum, and by the darker tibiæ. It appears likely that Leconte has anticipated us in recognizing this species (*Haltica punctipollis* Lec. 1857 *nec* Kby. 1837), but since this may not be the case and since Leconte's name is a homonym, it was thought better to propose a new species rather than a substitute name. Moreover, the insect figured by Essig, Ins. W. N. A. 1926, fig. 288, seems to belong here.

THE LUCANID GENUS DIPHYLLOSTOMA

(Coleoptera)

BY E. GORTON LINSLEY

Oakland, California

The genus *Diphyllostoma* is one of the most interesting as well as one of the most remarkable of the genera of the Lucanidæ. Two species have been known for some years by the male only. They have both been very rare in collections and practically nothing has been known of their biology. The recent capture of a considerable series of males of these species and the discovery of the flightless female, in addition to certain field observations on the group, has resulted in the following notes and remarks on the members of this genus.

Diphyllostoma Fall [1] (|| Phyllostoma Fall [2]) contains two small, slender species, with a small, transverse head, with two cephalic ridges which converge v-like at the base, large, subglobular, moderately finely granulated eyes, small mandibles, and straight antennæ. The adult insects are diurnal, flying in the early morning and late afternoon or evening. They are usually found in grassy areas and probably feed in the larval stage upon the living or decomposing roots of various wild grains or grasses. The female is wingless and exhibits many differences from the male, resembling in this respect the females of certain Scarabaeidæ and Cebrionidæ [3] which are similar in habits.

The following table, based upon male characters, will separate the two known species:

Mandibles strongly emarginate at tip; suborbital plates prominent; unicolorous, dark brown. 6-8 mm. Tulare County California ..... *fimbriata* (Fall)

Mandibles evenly rounded; suborbital plate inconspicuous; bicolored, prothorax piceous, elytra brownish. 5-9 mm. Middle Sierra Nevada Mountains, California ..... *nigricollis* Fall

1 Fall, H. C. Can. Ent. XXXIII, p. 324.

2 Fall, H. C. Can. Ent. XXXIII, p. 290.

3 For sexual differences in certain Cebrionidæ, see Biologia Centr. Americana, 1896, Coleoptera, III, Pt. 1, Plate 25, Figs. 19, 20.

DIPHYLLOSTOMA FIMBRIATA (Fall) (Page 119, fig. 3)

This species was described some thirty years ago from material taken by Mr. Ralph Hopping near Kaweah, Calif. The type specimens were collected on grain and wild grasses on a small sandy hill and were nearly all taken at dusk. Mr. E. R. Leach recently took a fine series under similar conditions at Hot Springs, Tulare County. His observations suggest that the beetles were merely crawling up the stems to take flight and were making no attempt to feed on these grasses. All of Mr. Leach's specimens were taken in a very limited area, one individual flying before 6 a. m., the remainder in late afternoon. This species has also been found in Sequoia National Park, where it was taken in numbers from the Power Company's flumes by Dr. E. C. Van Dyke and his students.[4] *D. fimbriata* is found from the middle of May to late July, between 1000 and 3500 feet altitude. Only the male is known.

DIPHYLLOSTOMA NIGRICOLLIS Fall (Page 119, figs. 1, 2, 2a)

The most important character separating this species from the preceding is the non-emarginate mandibles. In the female, which probably more nearly represents the common type from which the species were derived, the mandibles show a slight emargination. The sub-orbital plate is much more prominent in *D. fimbriata* than in *D. nigricollis*, but most of the other characters, such as the comparative length of the tarsi, the puncturation, and the elytral sculpturing lose their value in a series. The color differences are not always apparent, especially in fresh material, and at such times both species may be a more or less uniform dark brown. Usually, however, the elytra are distinctly lighter in *D. nigricollis*.

For many years this species was known only by the type material, but in the summer of 1930, Mr. Howard Hinton[5] took a series of males from a flume near Riverton, Calif. While collecting in the same region in early July, 1931, the writer and Mr. E. C. Zimmerman captured in addition a

[4] See note by E. C. Van Dyke, Pan-Pac. Ent. VII, 1930, p. 95.

[5] Hinton, H. Observations on Two California Beetles, Pan-Pac. Ent. VII, 1930, page 95.

long series of males and two females. Later in the same month, additional females were taken by Mr. Hinton. As the female proved to be quite different from the male, the following table was prepared to bring out a few of these peculiarities:

Male	Female
Fully winged.	Wingless, or with only slight wing rudiments.
Elytra parallel-sided, longer than abdomen.	Elytra broadly oval, shorter than abdomen.
Eyes large.	Eyes very small.
Tarsi much longer than posterior tibiæ.	Tarsi shorter than posterior tibiæ.
Anterior tibia with large apical tooth on inner side.	Apical tooth on anterior tibia replaced by a small slender spine.
Mandibles evenly rounded.	Mandibles slightly emarginate.

Like the preceding species, *D. nigricollis* apparently flies in the morning and late afternoon, although occasional specimens have been taken throughout the day. Nothing is known of the biology of this species, but it probably lives in the ground. The type series was taken in Fresno County, flying "in the pines" at 6600 feet altitude. The Riverton specimens were all taken at about 3000 feet, from May to July.

Amblycheila in California

A fine pair of *Amblycheila picolomini* Rche. has recently been added to the collection of the California Academy of Sciences by Mr. Joseph R. Slevin, Curator of Herpetology in the Academy, who collected them near Skidoo in the Panamint Mountains in eastern California, at an elevation of 5,500 feet. These specimens fit Reiche's description very well and are without doubt that species. The original description gave the locality as San Francisco but not until now has an *Amblycheila* been reported from this state. The species recorded above agrees also with River's illustration[1] of what he took to be *A. picolomini* from Peach Springs, Arizona, and it seems as though this name should be restored to specific standing.—J. O. Martin.

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1 Zoe. Vol. IV, pp. 218-223, plates 18, 19, 1893.

NOTES AND DESCRIPTIONS OF SOME NEW AND OLD GENERA AND SPECIES OF NORTH AMERICAN OEMINI AND METHIINI

(Coleoptera Cerambycidæ)

BY E. GORTON LINSLEY
Oakland, California

The Oemini and Methiini are two apparently related tribes of the Cerambycinæ. The species are nearly all rare in collections, and scarcity of material has resulted in many mistakes and considerable confusion in the literature. A monographic study of these tribes is impossible until a greater series of individuals can be examined and until a more complete knowledge of their biology can be obtained. The following paper is offered merely to place certain new species and to correct a few of the more obvious errors that have come to the attention of the writer. Appreciation is expressed to Dr. E. C. Van Dyke and Mr. E. P. Van Duzee for permission to describe certain species in the collection of the California Academy of Sciences and for helpful advice concerning some of the more perplexing problems encountered in the preparation of this paper.

Oemini

The Oemini constitute the first of a series of closely related groups which made up the Cerambycini of LeConte and Horn. The latter tribe has been broken up to form the Achrysonini, Cerambycini, Hesperophanini, Eburiini, Elaphidionini, and a number of others, to which Aurivillius has recently added the Methiini. In all of these tribes, the eyes are large, coarsely granulated, emarginate (rarely divided), the antennæ long with second segment small, and anterior coxal cavities angulated at the sides. The Oemini are separated from their relatives by the more or less corneous ligula. The species are dominantly Ethiopian but are well represented in tropical America. A few genera occur in Malasia as well as in the Nearctic fauna.

Among our genera, *Haplidus* is apparently the most primitive, and although it exhibits a facies peculiar to itself, it has few outstanding characters, and is very difficult to define.

Vandykea is one of the most highly specialized genera with many striking characters, showing certain affinities with *Styloxus* and the Methiini. Our genera may be separated as follows:

TABLE OF THE NORTH AMERICAN GENERA OF THE OEMINI

1. Eyes deeply emarginate, embracing base of antennæ; front coxæ prominent 2
   Eyes slightly emarginate, scarcely embracing base of antennæ: front coxæ moderately prominent ..... *Haplidus*
2. Prosternum narrow 3
   Prosternum broad 5
3. Prothorax rounded at sides 4
   Prothorax tuberculate at sides 6
4. Prothorax constricted at base; palpi very slightly dilated; prosternal process short ..... *Oeme*
   Prothorax lobed at base; palpi broadly dilated; prosternal process long ..... *Malacopterus*
5. Antennal segments 3-6 armed with a terminal spine, body uniformly pubescent; elytral apices spinose ..... *Eucrossus*
   Antennal segments 3-6 unarmed; body with transverse bands of yellow pubescence; elytral apices emarginate ..... *Dryobius*
6. Prothorax subquadrate; elytra distinctly costate; front coxæ separated by prosternal process ..... *Eudistenia*
   Prothorax elongate, with a large obtuse lateral tubercle; elytra without costæ; front coxæ contiguous behind ..... *Vandykea* n. g.

Genus HAPLIDUS LeConte

When LeConte originally defined this genus, he separated it from the other Oemini by the short, slender, equal palpi, and the less deeply emarginate eyes. The addition of two new species in which the palpi are very unequal in length and the last segment broadly dilated, necessitates an enlargement of the scope of the genus, and increases the difficulty of separating it from the other genera. However, I can find no constant characters to add to those given by LeConte, but it is my opinion that *Haplidus* is a distinct unit and should remain as such in our classification.

KEY TO THE SPECIES OF HAPLIDUS

1. Palpi slender, subequal in length, last segment cylindrical; prothorax more or less octagonal, sides parallel at middle. 9-15 mm. New Mexico to California ..... *testaceus* Lec
   Palpi very unequal in length, last segment broadly dilated; prothorax distinctly angulate, widest at middle 2

2. Head wider than prothorax; fourth segment of antennæ one-third shorter than third. 8 mm. Southern Arizona.....
.....*palpalis* n. sp.

Head narrower than prothorax, fourth segment of antennæ distinctly longer than third. 6-12 mm. California.....
.....*antennatus* n. sp.

Haplidus testaceus Lec [1]

This species is slightly larger than either of the following and ranges throughout the Great Basin area from New Mexico to California. The adults are frequently taken at light. The antennæ are longer than the body in the male, about as long as the body in the female, and the fifth ventral of the latter is rounded, that of the male emarginate. There is a small median smooth spot on the prothorax of the female which is replaced by a shining longitudinal line in the male.

In the series of individuals before me, the width of the head in proportion to the prothorax appears to be constant, but there is considerable variation in the length of the head. In certain specimens from Jemez Springs, New Mexico, the length of the head in the female varies from one-half as long as broad to as long as broad. This character is used by Colonel Casey to separate his *H. breviceps* (type locality Fort Wingate, New Mexico) from *H. testaceus*. Since the remaining characters mentioned by Casey are typically those of the latter species, I have considered *breviceps* as a variant of *H. testaceus*.

Haplidus palpalis Linsley, n. sp.

Elongate, slender, blackish-piceous and shining; pubescence short, sparse, subdecumbent, interspersed with a few longer scattered flying hairs. Head distinctly wider than prothorax; front short, vertical, vertex medianly sulcate; eyes coarsely granulated, emarginate, rather widely separated; antennæ slender, longer than the body (♂), scape moderately stout, second segment small, about as long as broad, third slightly more than four times as long as second, fourth one-fifth shorter than third, fifth two-thirds longer than fourth, following segments diminishing gradually in length toward apex (with exception of twelfth, which is suddenly shortened, being about two-thirds as long as eleventh). Prothorax slightly longer than broad, sides angulated; punctures dense and variolate, with the exception of a median polished line (♂). Elytra a little wider than prothorax, slightly more than three times as long as broad, apices rotundate

[1] LeConte, Smiths. Misc. Coll., 264, 1873, p. 175; LeConte and Horn, Class. Col. 1883, p. 284.

truncate. Beneath, punctures fine, sparse; ventral segments subglabrous. Length 8 mm.; breadth 1.75 mm.

Type, male, (No. 3604 Mus. Calif. Acad. Sci.) taken by the writer in Carr Canyon, Huachuca Mountains, Arizona, July 6, 1930, at light.

The type, a unique, has twelve-segmented antennæ, but this condition is probably abnormal. The antennal proportions are, exclusive of the twelfth segment, as in *H. testaceus*, but the shape and proportions of the prothorax, puncturation, and the very unequal, broadly dilated palpi will readily separate it from that species.

Haplidus antennatus Linsley, n. sp.

Elongate, subparallel, somewhat depressed, dark brownish-testaceous; pubescence subdecumbent, with scattered longer flying hairs; puncturation distinctly variolate. Head slightly narrower than prothorax, coarsely, densely punctured; front short, vertical, vertex medianly sulcate, eyes coarsely granulated, emarginate, rather widely separated; palpi very unequal in length, last segment broadly dilated; antennæ slender, longer than body (♂), shorter than body (♀), scape stout, as long as second and third segments together, second segment small, about as long as broad, third about three times as long as second, fourth one-third longer than third, fifth one-third longer than fourth, following segments diminishing gradually in length toward apex. Prothorax as long as broad, sides distinctly angulated, widest at middle, coarsely, variolately punctured. Elytra slightly broader than prothorax, about three times as long as broad, apices rotundate-truncate. Beneath, sparsely, finely punctured, abdomen clothed with fine, decumbent hairs. Length 10 mm.; breadth 2 mm.

Holotype, male, (No. 3605 Mus. Calif. Acad. Sci.) taken by the writer at Carnelian Bay, Lake Tahoe, California, July 20, 1931; allotype, female, (No. 3606 Mus. Calif. Acad. Sci.) from Santa Ana Canyon, Orange County, California, July 21, 1930, K. Sloop collector; paratypes: Trinity County, California, October 10, 1918, in collection of E. R. Leach; Lake Tahoe, California, July 18-22, 1930, in the collection of the writer.

In this species the proportions of the antennal segments are quite different from either *H. palpalis* or *H. testaceus*, and this character, in addition to the others given in the key, will easily separate it. The Lake Tahoe specimens were taken on *Pinus ponderosa* Dougl. and it is quite probable that all three species breed in coniferous trees.

Genus Oeme Newman [2]

The deep basal constriction of the prothorax will separate this genus from the other North American genera of the tribe. Most of the species are confined to the western or southern United States and three or four species are found in tropical America.

Oeme rotundicollis Linsley, n. sp.

Elongate, subparallel, yellowish-testaceous, clothed with a dense, fine, decumbent pile, interspersed with coarser more erect setæ and scattered flying hairs. Head slightly wider than prothorax, moderately coarsely, densely punctured; front short, vertical, vertex deeply longitudinally sulcate; eyes large, coarsely granulated, deeply emarginate; antennæ slender, about as long as the body (♀), annulate, scape moderately stout, second segment small, third nearly twice as long as scape, fourth two-thirds as long as third, following segments diminishing gradually in length toward apex. Prothorax one-third wider than long, moderately constricted at base, sides evenly rounded, widest at middle, apex slightly wider than base, disk moderately densely punctured with the exception of a median polished area (♀). Elytra three and one-half times as long as broad, distinctly wider than prothorax, feebly tricostate, finely closely punctured, suture margined with a thin dark line from base to apex, apices rotundate-truncate. Beneath, finely, closely punctured, shining. Length 14 mm.; breadth 3.5 mm.

Type, female, (No. 3607 Mus. Calif. Acad. Sci.) and one paratype, also a female, from Glen Ranch, Alpine, Texas, O. C. Poling collector (Van Dyke Collection).

This is the only species known to me in which the prothorax, anterior to the basal constriction, is evenly rounded at the sides. In most of the species the widest point is behind the middle, with the sides somewhat straight or gradually narrowed anteriorly. From *O. hirsuta* Van Dyke, the species with which *rotundicollis* might most easily be confused, it differs in the wider head, more slender antennæ, and dark sutural margin of the elytra. The dense pilosity, long slender antennal scape, and wide head will separate it from *O. rigida* Say. The round prothorax gives *rotundicollis* a very characteristic appearance.

Many writers have used the degree of development of the tubercles along the inner side of the third, fourth, and fifth antennal segments as a basis for the separation of species in

[2] Newman, Entomologist I, 1840, p. 8; Lacordaire, Gen. Col. VIII, 1869, p. 222; LeConte and Horn, Class. Coleoptera, 1883, p. 284.

the genus. This character is not only variable, but is to a great extent sexual. The tubercles are usually more highly developed in the male, and are often greatly reduced in size or entirely missing in the female.

Genus MALACOPTERUS Serv. [3]

Our only species, *M. tenellus* (Fab.), ranges from Central America to the southwestern United States. Two other species are known, both from Brazil.

Genus EUCROSSUS LeConte [4]

This genus is founded on *E. villicornis* Lec., an extremely variable species distributed throughout the Southwest. As mentioned by Leconte, there is little uniformity in the lateral prothoracic spine, and it may or may not be present. The males are, as a rule, lighter colored (more or less testaceous), with larger mandibles, and long, stout, very hairy antennæ. The female varies in color from dark testaceous to piceous. The puncturation of the prothorax may be uniform throughout or very uneven, in either sex. *Eucrossus phœnicis* Csy. appears from the description to be one of the dark females of *E. villicornis* Lec. In California, the host plant of *villicornis* is *Pinus sabiana* Dougl.

Genus DRYOBIUS LeConte [5]

LeConte and Horn in their Classification of the Coleoptera associate this genus with *Eucrossus*, accrediting *D. sexfasciatus* (Say) with spinose antennæ. In the six specimens before me from Kentucky (Van Dyke Collection) and Cincinnati, Ohio (Blaisdell Collection), the antennæ are entirely unarmed.

Genus EUDISTENIA Fall [6]

This interesting genus is based upon *E. costipennis* Fall (Fig. 4), and is easily distinguished by the characters given in the key. *Eudistenia costipennis* is a rather rare species found in central and southern California. Fall's original specimens were beaten from oak, but I have two examples from Yosemite Valley which were taken on *Pinus ponderosa* Dougl.

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3 Serville, Soc. Ent. France, II, 1833, p. 565; LeConte and Horn, Class. Col. 1883, p. 284.

4 LeConte, Smiths. Misc. Coll. XI, 1873, p. 134; LeConte and Horn, p. 284.

5 LeConte, Journ. Acad. N. S. Phil., II, 1850, p. 23; LeConte and Horn, p. 284.

6 Fall, H. C. Journ. N. Y. Ent. Soc. XV, 1907, p. 82.

Genus **Vandykea** Linsley, new genus

Elongate, subcylindrical. Head distinctly narrower than prothorax; front short, genæ small, acute, vertex deeply grooved; palpi slightly unequal in length, terminal segment somewhat dilated; eyes coarsely granulated, deeply emarginate, widely separated above and below; antennæ longer than the body, moderately slender, sparsely hairy beneath; longer than broad, third, fourth, and fifth segments subequal, tuberculate beneath, remaining segments diminishing in length toward apex. Prothorax elongate, with well developed lateral tubercles. Elytral apices subtruncate. Scutellum obtusely triangular. Anterior and middle coxæ rounded, strongly angulated externally, open and contiguous behind; prosternal process very narrow, only partially separating the coxæ; metasternal episterna narrow, slightly wider anteriorly. Legs moderate, not clavate; tibial spurs short; tarsi finely pubescent beneath, first segment as long as remaining three.

Genotype, *Vandykea tuberculata* n. sp.

This genus is founded on a moderate sized species from California which shows relationship with *Styloxus (Idœmea)* in the Methiini. The ligula is apparently corneous, but this could not be determined without dissection, an operation that would have endangered the unique type. The other characters are, however, essentially those of the Oemini.

I take great pleasure in dedicating this genus to Dr. Edwin C. Van Dyke, whose generous and patient help, in addition to the high character of his entomological contributions, has been a continual inspiration to me.

Vandykea tuberculata Linsley, n. sp.

(Page 119, fig. 5)

Piceous, upper surface densely, rugosely punctured, sparsely clothed with coarse, pale, erect and semi-erect hairs. Head medianly sulcate at apex; front short; antennæ twice as long as body (♂), rather sparsely clothed with coarse, pale hairs, more numerous on inner surface. Prothorax slightly longer than broad, with a deep subapical constriction and a well developed lateral tubercle; base slightly narrower than apex; entire surface coarsely punctured with the exception of a narrow median longitudinal polished line on basal half (♂). Elytra as wide as prothorax, about three and one-half times as long as broad; pubescence sparse, short, decumbent; costæ not evident. Beneath, sparsely clothed with coarse, pale hairs. Length 13.5 mm.; breadth 2.5 mm.

Holotype, male, (No. 3608, Mus. Calif. Acad. Sci.), a unique, taken in Pope Valley, Napa County, California, May 8,

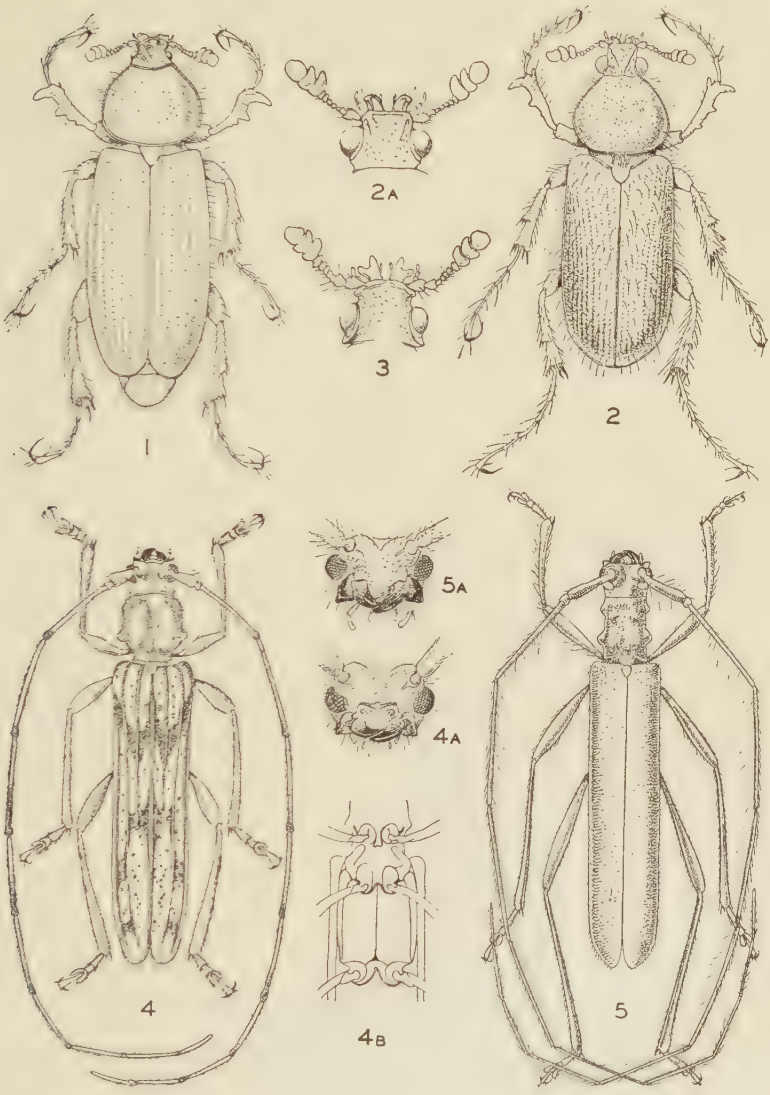

Fig. 1, 2. *Diphyllostoma nigricollis* Fall; fig. 3, *Diphyllostoma fimbriata* Fall; fig. 4, *Eudistemia costipennis* Fall; fig. 5, *Vandykea tuberculata* Linsl.

1930, by Dr. E. C. Van Dyke. The specimen was beaten from *Cupressus sargentii* Jepson.

Methiini

The Methiini have always been a more or less puzzling group to the systematist, and their position in relation to the other groups of the Cerambycidæ has been many times in dispute. J. Thomson,[7] basing his opinion on *Methia pusilla* Newman, placed them in the Lamiinæ *(Lamiites)*, noting, however, a similarity to *Obrium*. Lacordaire[8] also placed them in the Lamiinæ, but pointed out a resemblance to *Molorchus*. LeConte and Horn,[9] with more material before them, group them as the last tribe of the Lamiinæ *(Lamiidæ)*, stating that they were the lowest organized of the Lamiinæ, "undifferentiated forms, which exhibit strong relationships with *Oeme* and its allies among the Cerambycidæ." Finally, Aurivillius[10] definitely associated them with *Oemini* (as Tribe X of the Cerambycinæ). This position is a good one and is justified by structural characters as well as by the habits of the group.

The various genera of the Methiini have also been subject to confusion. Newman,[11] in his original description of *Methia pusilla*, stated that the second antennal segment was obsolete. In all of the species since described and referred to this genus, the second segment, although very small, is clearly visible. Schaeffer[12] states that "the type species of this genus, *pusilla*, ... is said to have the second joint obsolete, but in a specimen in Mr. Beyer's collection, the second joint, although exceedingly small, is visible with a strong lens."

Key to Genera of the Methiini

1. Eyes divided, moderately granulated; second antennal segment obsolete ..... *Tessaropa*
   Eyes deeply emarginate but undivided, coarsely granulated; second antennal segment small but visible 2
2. Thorax as broad or broader than long, sides more or less arcuate; femora not clavate ..... *Methia*
   Thorax distinctly longer than broad; sides parallel or subangulate; femora clavate ..... *Styloxus*

7 Thomson, J. Essai Class. Famille des Cerambycides, 1860, p. 364.
8 Lacordaire, I. T. Gen. Coleoptera, 1869, IX, p. 466.
9 LeConte and Horn, Classification of the Coleoptera, 1883, p. 333.
10 Aurivillius. Chr. Cerambycinæ, Junk Coleopt. Cat. 39, 1912, p. 38.
11 Newman, E. Entomologist I, 1842, p. 418.
12 Schaeffer, C. Bull. Brook. Inst., I, 1908, p. 352.

Genus METHIA Newman

Until recently this genus was considered endemic to North America, but the discovery of two species in South America [13] has considerably extended its range. The species are nearly all small, delicate insects, with greatly abbreviated elytra and long, slender antennæ. The following is apparently undescribed:

Methia fragilis Linsley, n. sp.

Elongate, subparallel, piceous, elytra marked with large, irregular, indistinct pale areas, more noticeable toward apex; pubescence fine, moderately dense, subdecumbent, interspersed with longer flying hairs. Head large, coarsely punctured, one-sixth wider than prothorax; eyes very large, coarsely granulated, deeply emarginate, nearly contiguous above and below; antennæ twice as long as body (♂), scape distinctly longer than head, second segment small, about half as long as broad, third about twice as long as first and second together, fourth and following segments subequal, diminishing only slightly in length toward apex. Prothorax slightly broader than long, sides arcuate, base constricted, puncturation slightly umbilicate. Scutellum longer than broad, deeply sulcate. Elytra three times as long as broad, dull, pubescence fine, obscuring puncturation, apices rounded. Beneath, body sparsely pubescent with long pale hairs. Length 7 mm.; breadth 1.75 mm.

Holotype, male (No. 3609, Mus. Calif. Acad. Sci.), from Santa Ana Canyon, Orange County, California, May 30, K. Sloop Collector, and one paratype, male, from Paraiso Springs, Calif., August 25, 1924, in the L. S. Slevin Collection, California Academy of Sciences.

This is a small slender species related to *M. mormona* Linell. It is, however, smaller and more delicate than *mormona* with a different style of puncturation, and more narrowly separated eyes (this last character is of use only when comparing members of the male sex). The elytra, in *M. mormona* are shining and sub-glabrous, with the puncturation well defined at the base. In *M. fragilis*, the elytra are dull, the pale markings indistinct, and the pubescence fine, obscuring the puncturation. It is much more slender than *M. æstiva* Fall, and exhibits a different type of coloration.

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[13] M. argentina Bruch, Rev. Museo La Plata, 24, 1919, p. 20 (Fig.). M. fischeri Melzer, Rev. Museo Paulista, 13, 1923, p. 531 (Fig.).

Genus Styloxus LeConte

After a careful study of the literature and material at hand, I am unable to find any characters to warrant the continued separation of *Idœmea* Horn and *Styloxus* Lec. and I propose that the two be united. Most of the characters mentioned by Horn [14] lose their importance when viewed in the light of added species and greater series. When Horn described *Idœmea*, *Styloxus* was known by a single male specimen, and although Horn states that his specimen of *I. fulleri* was a male, I am inclined to believe from his description that it was a female (widely separated eyes and short antennæ are typically female characters in the Methiini), and that many of the characters by which he separated the genus were sexual characters. Since Horn's time, three more species have been added to *Idœmea*. Two of these, *I. californica* and *I. texana* are congeneric with *I. fulleri*. The third species, *I. bicolor* (*Styloxus ruficeps* Van Dyke), might be placed equally well in either genus. The synonymy of Styloxus is as follows:

Styloxus Lec
Idœmea Horn
Malthophia Csy.

lucanus Lec
bicolor (Champ and Knull)
ruficeps Van Dyke
californicus (Fall)
oculatus (Csy.) [15]
fulleri (Horn)
texanus (Schffr.) [16]

Explanation of Plate

1. *Diphyllostoma nigricollis* Fall, female.
2. *Diphyllostoma nigricollis* Fall, male.
2a. *Same,* dorsal view of head.
3. *Diphyllostoma fimbriata* (Fall), head of male.
4. *Eudistenia costipennis* Fall, male.
4a. *Same,* front view of head.
4b. *Same,* ventral view of thoracic region.
5. *Vandykea tuberculata* Linsley, male.
5a. *Same,* front view of head.

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[14] Horn, G. H. Trans. Am. Ent. Soc., VIII, 1880, p. 138.
[15] Van Dyke, E. C. Pan-Pacific Ent., III, 1927, p. 101.
[16] S. texanus may eventually prove to be the male of S. fulleri (Horn).

A FEW NEW BUTTERFLIES

(Lepidoptera, Rhopalocera)

BY J. D. GUNDER
Pasadena, California

Parnassius eversmanni Men., (race *thor* Hy. Edw.?), tr. f. *kohlsaati,* new

The usual red color within the spotting on the upper and under sides of the secondaries is here a yellow. Classification: chromatism; color change, red to yellow.

Holotype ♂ : expanse 53 mm., McKinley National Park, Alaska, June 27, 1931. Collected by Frank Morand of Los Angeles. Named after Mr. John E. C. Kohlsaat of Carpenteria, California. Type in author's collection. The colored illustration of *eversmanni* Men. (Siemashko Russ. Faun., pl. IV, f. 5, 1849) is marked with a male sign and *wosnesenskii* Men. (Siemashko Russ. Faun., pl. IV, f. 6, 1849) is marked with a female sign. A dozen varital names have been given to Asian deviations of this species. Mr. J. F. May of Kelwood, Manitoba, took a female *eversmanni* in the Babine Range above Smithers, B. C., on July 20, 1931. This is a new southern locality for this species. He also took on July 26, 1931, *Melitaea mayi* Gun. (Bul. Brooklyn Ent. Soc., Dec., 1929, p. 327) in the same region which is another new record for British Columbia. This is the third consecutive season that Mr. May has collected this rather rare *Melitaea*, a good series being obtained last year from the type locality.

Parnassius clodius Men., tr. f. *dodgei,* new

Having the spotting of the secondaries a definite yellow instead of red. Classification: chromatism; color change, red to yellow.

Holotype ♂ ; expanse 63 mm., Santa Cruz Hills, Santa Cruz, California, June 15, 1923. Named after Mr. E. A. Dodge of Santa Cruz, California. Type in author's collection. An example of *dodgei* from Bear Valley, Marin County, just to the north, is illustrated on pl. 5, fig. 6, in Comstock's "Butterflies of

California." Mr. C. W. Herr of Priest River, Idaho, spent last summer collecting in the Salman Mountain Ranges of south central Idaho, particularly near Mt. Hyndman, being about thirty miles from Lake Alturas, the type locality of *alturas* Dyar. In his long series in both sexes of *Parnassius* taken, all have yellow spots. Therefore *alturas* Dyar is a definite race of *clodius* and should be re-listed as such following Dyar's own check list. Dyar's *lapsus calami* in that list was his own locality given as Wyoming instead of Idaho.

Parnassius clodius Men., race *baldur* Edw.,
tr. f. *sulfureus*, new

On both upper and under sides of the secondaries all the spots are a bright yellow instead of red with no maculation change. Classification: chromatism; color change, red to yellow.

Holotype ♂; expanse 60 mm., allotype ♀; expanse 63 mm., Davis Creek, Modoc County, California, June 12, 1924, for male, and June 18, 1924, for female. Types in author's collection. *Binigrimaculella* Gun. should be synonymed under *lorquini* Oberth, because both represent immaculism under change of pattern.

Anthocaris sara Bdv., race *reakirtii* Edw.,
tr. f. *broweri*, new

Transition form *sternitzkyi* Gun. of race *reakirtii*, which is a color change under chromatism, red to yellow, is well illustrated by the colored plate in the January, 1925, *Ent. News*. A series of these are now to be found in various collections. *Broweri* represents albinism under color change through to white, the apical colored areas on both upper and under sides of the primaries being a natural pure white, in color like the rest of the wing, all white. Thus we now record a complete sequence of color change as follows: typical *reakirtii* having the usual red apical area *sternitzkyi*, the yellow apical area, and *broweri* reverting to a natural white area. No more names can be added under change of color, as the sequence is complete, it being improbable that violet, blue, etc., on up, can be added within the temperate habitat of this species and race. *Wrighti* Comst. represents melanifusism under change of pattern.

Holotype ♂ ; expanse 37 mm., Peanut Hill, Berkeley Hills, Alameda County, California, March 14, 1928. Named after Mr. David R. Brower of Berkeley, California. Type in author's collection.

Zerene eurydice Bdv., tr. f. *doudoroffi,* new

Similar in all respects to the typical yellow female, except that the color is white. Classification: albinism; change of color, yellow to white.

Holotype ♀ ; expanse 57 mm., Lake Alpine, Fairfax, Marin County, California, July 17, 1929. Named after Mr. M. Doudoroff of San Francisco. Type in author's collection. See "Review of the Genus Zerene" in the January, 1928, PAN-PACIFIC ENTOMOLOGIST. This name should be placed immediately following tr. f. *newcombi* Gun. of the "new listing" given on page 102 of that article. The recording of this name makes an interesting record, especially as more is becoming known about colors in certain genera.

Brenthis alberta Edw., tr. f. *banffensis,* new

Lacking the transverse black maculation through the discal area on both upper and under sides of the primaries, but retaining submarginal rows of spotting with cell spots reduced in appearance. Spotting of secondaries reduced in size. Classification: immaculism; change of pattern, example not final.

Holotype ♂ ; expanse 40 mm., Banff, Alberta, Canada, July 21, 1930. Collected by Mr. J. F. May of Kelwood, Manitoba, Canada. Type in author's collection.

Euphydryas chalcedona Dbldy. and Hew., race *colon* Edw., tr. f. *fenderi,* new

White spotting on both upper and under sides of both wings elongated through their interspaces. Looks like *chalcedona fusimacula* Barnes as illustrated by fig. 3 on pl. VII in the November, 1927, *Entomological News.* Tr. f. *mcdunnoughi* represents melanifusism and is illustrated with its description. Classification: albifusism; change of pattern, well developed degree, beneath especially.

Holotype ♂ ; expanse 43 mm., near McMinnville, Yamhill County, Oregon, May 29, 1931. Named after Mr. K. M.

Fender of that city, who recently published a list of local Oregon butterflies. Type in author's collection.

Euphydryas chalcedona Dbldy. and Hew., race *perdiceas* Edw., tr. f. *svihlæ*, new

Having the white elongated and fused spotting through the interspaces on both upper and under sides of both wings after the fashion of *chalcedona fusimacula* Barnes. *Nigrisupernipennis* Gun. represents melanifusism as illustrated with its description. Classification: albifusism; change of pattern, a well developed specimen, but not quite final.

Holotype ♀ ; expanse 50 mm., Hurricane Hill, Olympic Mountains, Washington, July 6, 1931. Named after Mrs. Ruth Dowell Svihla of Pullman, Washington. Type in author's collection. The Olympic Mountain *perdiceas* are very typical and match Holland's new illustrations in his Revised Edition of the Butterfly Book. I was particularly glad to get a series of Mrs. Sivhla's specimens from that near-type locality.

Euphydryas chalcedona Dbldy and Hew., race *quino* Behr, tr. f. *hennei*, new

Elongated white spotting through the interspaces as in *chalcedona fusimacula* Barnes. Classification: albifusism; change of pattern, fairly well developed only, primaries especially.

Holotype ♀ ; expanse 40 mm., Chino Canyon, Palm Springs, California, April 14, 1930. Named after Mr. Chris Henne of Pasadena, California. Type in author's collection.

Euphydryas anicia Dbldy and Hew., tr. f. *mayi*, new

Upper side having an outer marginal double-width border of red spots on both wings with balance of wings jet black, except the two red cell spots as usual on both wings. Under sides a solid red color on both wings except for faint transverse black lines through discal areas, marking an obscure former black maculation. A beautiful specimen looking like the colored illustration of the type of *editha beani blackmorei* Gun. Classification: melanifusism; change of pattern, a practically final grade of development.

Holotype ♂ ; expanse 37 mm., Banff, Alberta, Canada,

July 4, 1930. Taken by that ardent collector, Mr. J. F. May, of Kelwood, Manitoba, Canada. Type in author's collection.

Euphydryas anicia Dbldy. and Hew., race *hermosa* Wri., tr. f. *venusta,* new

As in race *maria* Skin. tr. f. *skinneri* Gun. which is illustrated with its description, this transition form has the white streaked spotting through the interspaces more noticeable on both upper and under sides of the primaries. Classification: albifusism; change of pattern, primaries developed to a greater extent.

Holotype ♀ ; expanse 50 mm., Cottonwood Canyon, above Roosevelt Camp, Roosevelt Dam, Arizona, July 29, 1930. Collected by Mr. Frank Morand of Los Angeles. Type in author's collection.

Plebeius aquilo Bdv., tr. f. *kohlsaati,* new

Having the submarginal row of five or six black spots elongated inwardly into long, dart-shaped points on the under side of the primaries. The under side of the secondaries having the white maculation slightly elongated inwardly also. Upper sides as usual. Classification: melanifusism; change of pattern, probably about final.

Holotype ♂ ; expanse 23 mm., Mt. McKinley National Park, Alaska, July 29, 1930. Collected by Mr. Frank Morand of Los Angeles and named after Mr. John E. C. Kohlsaat of Carpenteria, California. Type in author's collection.

Plebeius sæpiolus Bdv., tr. f. *boharti,* new

Lacking all the usual spotting on the under sides except outer marginal row on both wings. Usual lunate cell spots in evidence. Upper sides as usual. Tr. f. *leussleri* Gun. represents melanifusism or the elongation of the black spotting, while this name represents lack of maculation, which is the opposite condition. These are the two and possibly only kinds of change of pattern transition forms to be found in the Lycæninæ. Classification: immaculism; change of pattern, final grade in type.

Holotype ♀ ; expanse 26 mm., Yosemite National Park, California, July 24, 1931. Collected by and named after Mr. R. M. Bohart of Berkeley, California. Type in author's collection.

THE GENUS ENDEODES LECONTE
(Coleoptera, Melyridæ)

BY R. E. BLACKWELDER
Stanford University, California

The insect fauna of the inter-tidal area of the Pacific Coast has received little attention by entomologists, though it presents many features of exceptional interest. In the Coleoptera Dr. E. C. Van Dyke has described three new inter-tidal species from our coast representing three families.[1] Messrs. Ferris and Chamberlin have treated our species of Liparocephalus and Diaulota,[2] and Saunders [3] has reported the general habits of two of these. The present paper records a genus which, though originally described from the seashore, has never been reported as inter-tidal. The family Melyridæ is quite generally found on flowers, but this genus, Endeodes LeConte, is found only in the rubbish on the beaches of our coast.

Two species of Endeodes were first described by LeConte from San Diego and one from San Francisco and they were placed in the European genus Atelestus Erichson. Later LeConte recognized and named the genus Endeodes for his three American species. Since then nothing has been added to the knowledge of the genus. Two new species are here recorded, bringing the total to five.

The species fall readily into two groups, probably not deserving of subgeneric rank. The species *basalis* and *abdominalis* belong to one group, and the species *insularis, collaris* and *rugiceps* belong to the other, as indicated by the elytra, genitalia, and shape of the prothorax (Fig. 3).

As far as I can learn, all other persons who have collected these beetles have taken it for granted that they live under rubbish on the beach above high tide mark. With few exceptions, the sixty specimens I have collected, from San Francisco to San Diego, have been found near high tide mark but defi-

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1 Van Dyke, E. C. New Inter-Tidal Rock Dwelling Coleoptera from California, Ent. News, XXIX, 303-308, 1918.

2 Chamberlin, J. C., and Ferris, G. F. On Liparocephalus and Allied Genera, Pan-Pac. Ent., V, 137-143, 153-162, 1929.

3 Saunders, L. G. Some Marine Insects of the Pacific Coast of Canada, Ann. Ent. Soc. Am., XXI, 521-545, 1928.

nitely in the damp areas wet regularly by high tides. They were all found under rubbish, especially boards.

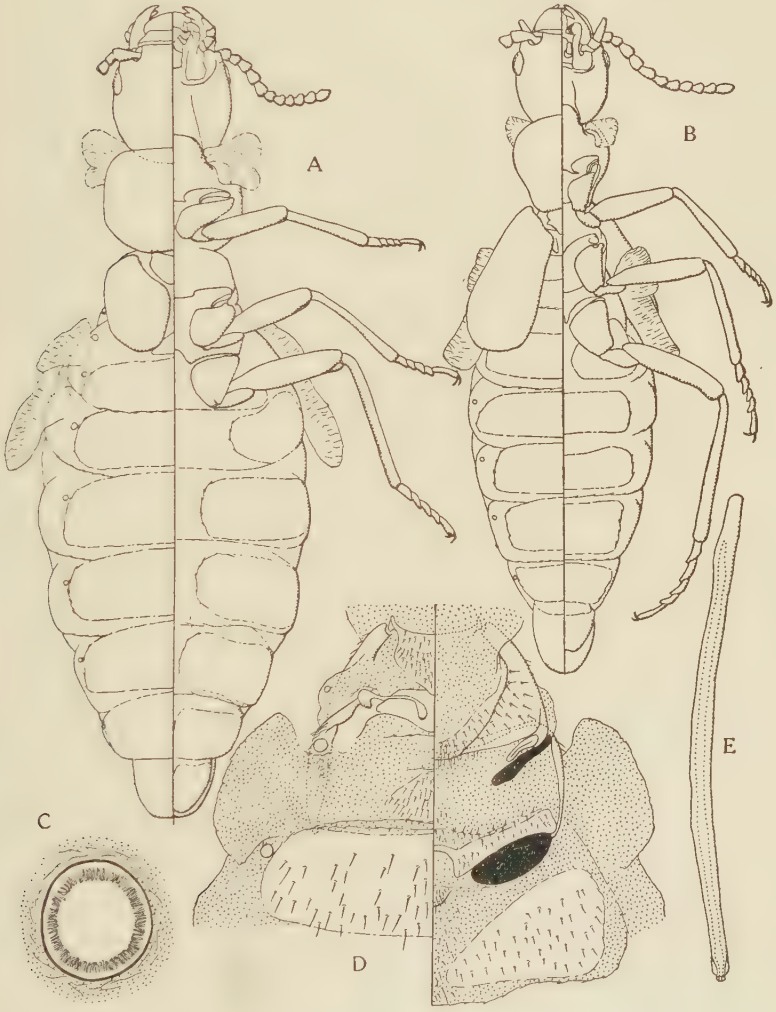

Figure 1. *Endeodes collaris* (LeConte); A, female, outline of body, vesicles extended, setæ omitted; C, first abdominal spiracle; D, details of meso- and metathorax, elytra and legs removed; E, spermatheca. *Endeodes basalis* (LeConte); B, female, outline.

Mr. E. P. Van Duzee and Mr. J. O. Martin of the California Academy of Sciences have greatly aided me by the loan of material and by other kindnesses, and Drs. E. C. Van Dyke and F. E. Blaisdell, Sr., have very kindly given permission for me to use the specimens in their collections. Professor G. F. Ferris of Stanford University has been very liberal with his help and advice, and has discussed with me many of the problems of morphology, interpretations, et cetera.

Endeodes is a genus of Melyridæ referable to the subfamily Malachiinæ and therefore characterized by the presence of extensile membranous vesicles on the prothorax and between the metathorax and the abdomen. It is distinguished from the other genera of the sub-family by the following characters: Wings completely lacking; elytra not exceeding one-half the length of the abdomen; antennæ 11-segmented; tarsi 5-segmented in both sexes, second segment of the fore tarsi of the male expanded and prolonged over the third segment and terminated by a comb of stout, black setæ.

Type of the genus, *Atelestus basalis* LeConte. The type specimen is in the LeConte Collection in the Museum of Comparative Zoölogy at Cambridge, Massachusetts, along with the types of the other two species of LeConte.

Since the characters of this genus have never been published, some of the outstanding features are included here. The general form (Fig. 1 A, B) and appearance is very similar to that of the Staphylinidæ.

The head is strongly depressed and nearly round. The antennæ (Fig. 2 A) are 11-segmented, in contrast to the ten segments found in certain other genera, but present no features of special interest, there being none of the secondary sexual modifications found in the related genus Collops. The labrum is broadly oval and distinct from the clypeus, which is likewise distinctly separated from the front. The mandibles (Fig. 2 E) are stout and strongly two-toothed, with a small membranous lobe or prostheca at the base of the inner face. The maxilla (Fig. 2 C) consists of two flat lobes, the lacinia and galea, the latter consisting of two flat segments, the maxillary palpi are four-segmented. The labium (Fig. 2 D) is small, the mentum quadrate, the prementum not separated from the ligula or the palpigers, the labial palpi three-segmented.

The prothorax varies considerably in form (Fig. 3 M, N, O, P), the sides of the pronotum not margined, but sometimes deflexed.

The prosternum is short, not separating the coxæ, but with extensile membranous vesicles issuing from a slit on each side near the anterior angles. The coxal cavities are large, confluent and open behind. The mesosternum is short, not separating the coxæ, with the episterna attaining the coxæ. The metasternum is short, very slightly prolonged between the posterior coxæ and more or less notched at tip. The mesothoracic and metathoracic spiracles are present though small, the former being in the membrane between the mesothorax and the prothorax and drawn up inside the prothorax. The elytra are variable in size and shape (Fig. 3 I, J, K, L), but are never more than half as long as the abdomen and always meet down

Figure 2. *Endeodes collaris* (LeConte); A, antenna; B, ventral aspect of head; C, details of maxilla; D, details of labium; E, mandible, showing membranous lobe; F, anterior tarsus of male, with comb of setæ; G, anterior tarsus of female; H, detail of claw, showing membranous appendage; I, details of tip of female genitalia; J, female genitalia.

the center for at least part of their length. They are coarsely punctate with the surface irregularly channeled between the punctures. The hind wings are entirely absent. The legs (Fig. 2 F, G) are moderately long and slender; the coxæ large, prominent and conical; the trochanters are distinct; tibiæ without distinct spurs; anterior tarsi of male with the second segment prolonged in a curved lobe over the third and the base of the fourth, the lobe bearing a comb of stout setæ around its terminal edge; middle and posterior tarsi of male and all tarsi of female normal, each segment prolonged slightly under the base of the next, and decreasing in size from the first to the fourth segment, the fifth being at least as long as the third and fourth together. The claws (Fig. 2 H) are small, each bearing a large inferior membranous appendage.

The abdomen, exclusive of the genitalia, consists of eight segments, only six ventral segments being visible. Seven pairs of abdominal spiracles are present (Fig. 1 C), the first pair not enlarged. They are situated in the membranes between the tergites and the sternites, no paratergites (pleurites) being present. The vesicles of the abdomen (Fig. 1 A) arise from the same region between the first and second and the second and third segments. The genitalia of the male (Fig. 3 A, B, D, E, F) consist of a long and tubular median lobe and a tegmen forming a cap-piece on the dorsal face, the basal angles meeting together beneath the median lobe, forming a ring; the central part of the cap-piece is membranous; and the tip of the median lobe is armed with very fine recurved spines (Fig. 3 C). The genitalia of the female (Fig. 3 J) have two small styli borne on the end of the coxite, which shows apparent secondary division; each valvifer is reduced to a long baculum articulating with a short baculum in the base of the coxite (Fig. 3 I); the paraproct is also reduced to a baculum. A spermatheca is present in the females in the form of a long tube (Fig. 1 E). The pygidium of the female (Fig. 3 G, H) varies slightly in form and in the extent of the sternal area.

The new species *E. rugiceps* Blackwelder differs from *E. collaris* (LeConte) chiefly in color. But color seems to be very constant in all the species and is the easiest character for separating them. It can be used either for dried specimens or for those cleared and mounted on slides.

Key to the Species of Endeodes

1. Elytra nearly half as long as abdomen, black with base pale..... 2
   Elytra much less than half as long as abdomen; of one color throughout 3
2. Abdomen yellow or fuscous ..... *basalis*
   Abdomen black ..... *abdominalis*
3. Legs, antennæ, and mouthparts darker than thorax..... 4
   Legs, antennæ, and mouthparts pale..... *insularis*

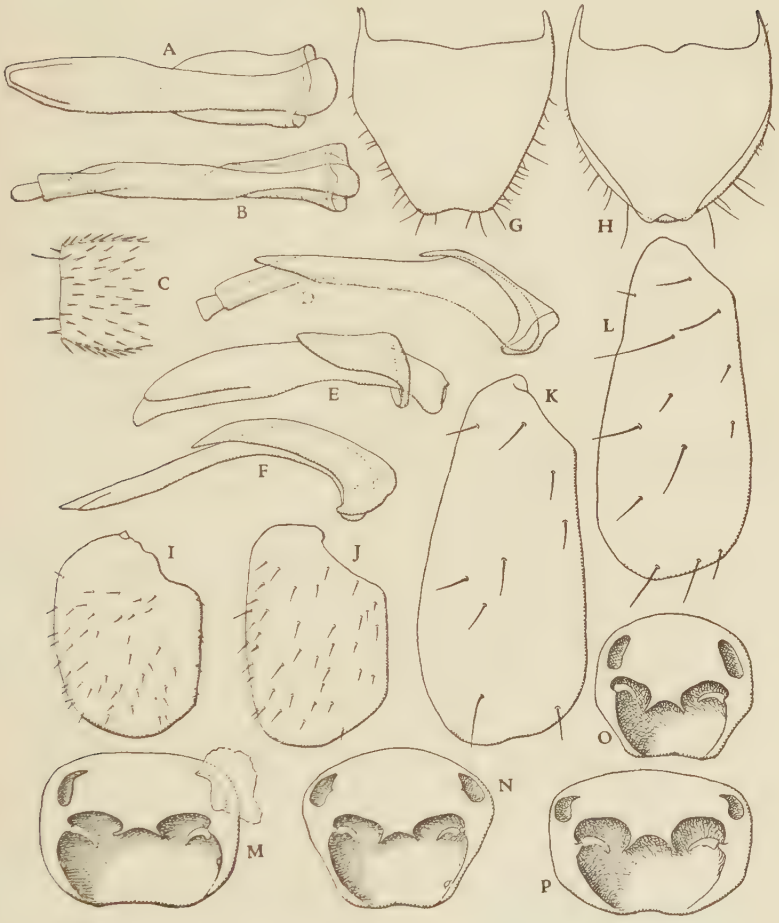

Figure 3. *Endeodes abdominalis* (LeConte); A, ventral aspect of male genitalia; K, left elytron of male; N, ventral aspect of prothorax, legs removed. *Endeodes basalis* (LeConte); E, lateral aspect of male genitalia; L, left elytron of female; O, ventral aspect of prothorax, legs removed. *Endeodes insularis* Blackwelder; F, lateral aspect of male genitalia; J, left elytron of male; P, ventral aspect of prothorax. *Endeodes collaris* (LeConte); B, ventral aspect of male genitalia; H, ventral aspect of pygidium of female; I, left elytron of male; M, ventral aspect of prothorax. *Endeodes rugiceps* Blackwelder; G, ventral aspect of pygidium of female.

4. Head black.....*collaris*
Head reddish.....*rugiceps*

Endeodes basalis (Lec.)

Fig. 1 B. Entire body pale; elytra black with a small reddish patch at the base. Head round, prothorax about as long as wide (Fig. 3 O). Elytra (Fig. 3 L) nearly half as long as the abdomen, becoming wider from base toward apex, and meeting down the center for most of their length. Median lobe of male genitalia large and thick (Fig. 3 E), the tegmen broad, but only about one-third as long as the median lobe. Length 3-5 mm.

This species is the type of the genus and is the smallest member, the average being somewhat less than *abdominalis* or *insularis*. May be known from all the others by its yellow or reddish abdomen. Taken in San Diego, Ventura, and San Luis Obispo Counties, California.

Endeodes abdominalis (Lec.)

Body black, with the head, prothorax, scutellum, and base of elytra ferruginous. Prothorax much wider near apex than at base (Fig. 3 N). Elytra (Fig. 3 K) nearly as long as the abdomen and more expanding apically than in *basalis*. Male genitalia (Fig. 3 A) with large, thick median lobe, and broad tegmen nearly one-half as long as the median lobe. Length 3-6 mm.

May be distinguished by its red head and red basal portion of elytra with abdomen black. Taken in San Diego, Los Angeles, Ventura and San Luis Obispo Counties, California.

Endeodes insularis Blackwelder, n. sp.

Head nearly equilateral, reddish. Prothorax reddish, decidedly wider than long (Fig. 3 P). Elytra entirely reddish, one-third the length of the abdomen or less (Fig. 3 J), and meeting down the center for about half their length. Median lobe of male genitalia long and very slender; the tegmen very large and wide, over half as long as median lobe and almost completely surrounding it for one-quarter of its length (Fig. 3 F). Length 3-6 mm.

Holotype, female, (No. 3610, Mus. Calif. Acad. Sci.), collected by V. W. Owen, June 20, 1910, on San Miguel Island, California. Allotype, male, same data, author's collection. Paratypes, six females and three males, same data, and one

male from Prince Island, California, collected by E. P. Van Duzee, June 29, 1919.

Distinguished by its black elytra and pale legs.

ENDEODES COLLARIS (Lec.)

Fig. 1 A. Body entirely black except for the prothorax. Head (to base of labrum) shorter than wide; prothorax decidedly wider than long, rectangular (Fig. 3 M). Elytra (Fig. 3 I) black, less than one-third the length of the abdomen, and not meeting along the center except just behind the black scutellum. Pygidium of female rounded behind, not distinctly emarginate (Fig. 3 H). Genitalia of male rather slender, median lobe not expanded, tegmen rather narrow but nearly half as long as the median lobe (Fig. 3 B, D). Length 5-7 mm.

This is our commonest species. It is distinguished by its black head and dark legs. It is common from Monterey County to Marin County in California, and has been found in Washington.

* **Endeodes rugiceps** Blackwelder, n. sp.

Head almost entirely reddish; the elytra reddish and the pygidium of the female broadly emarginate behind (Fig. 3 G). Elytra, prothorax, and male genitalia as in collaris. Length 5-8 mm.

Holotype, female, (No. 3611, Mus. Calif. Acad. Sci.), collected by L. S. Slevin, March 25, 1923, at Carmel, Monterey County, California. Allotype, male, taken by the author at San Remo Beach, fifteen miles south of Carmel, California, July 24, 1931, in the author's collection. Paratypes, nine females and four males, from Monterey County and Point Loma, San Diego County, California.

This species resembles *collaris* closely, but may be known at once by its red head. It is apparently rather rare on beaches in Monterey County, California. There is one specimen labelled Point Loma, San Diego County, California, in the Van Dyke collection.

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Endeodes collaris (LeConte), Proc. Acad. Nat. Sci., Phila., VI, 168, 1852 (Atelestus).
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Endeodes rugiceps Blackwelder, new species.

A New Work on the Elateridæ

The California Academy of Sciences recently has published an important entomological paper by Dr. E. C. Van Dyke on the North American Elateridæ.[1] In this work of 175 pages Dr. Van Dyke has characterized one new genus, sixty-six new species and twelve new subspecies or varieties. It is principally a treatise on eleven genera, including some of the larger and more obscure of those found north of Mexico. For each of these genera the author has given us a key to the species, a synonymical catalogue of the species with references to the literature, descriptions of such new species as were available to him, and critical notes on many of the more obscure forms. The genera so treated are: *Conoderes, Elater* (in part), *Megapenthes, Anchastus, Limonius, Elathous, Athous, Ludius, Euthysanius, Plastocerus* and *Aplastus*. The new genus is *Parædostethus*, related to *Hypnoidus*, with one new species. Certain other genera are treated more or less briefly.

For many years Dr. Van Dyke has given this family of beetles special attention so he not only had a great amount of material before him, but, what was of equal importance, he had the background of field experience by which to judge of toxonomic values, the results of which are given us in these pages. Altogether it is one of the most valuable contributions to a knowledge of our North American Coleoptera that has appeared in a long time.—E. P. Van Duzee.

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1 Miscellaneous studies in the Elateridæ and related families of the Coleoptera. Proceedings of the California Academy of Sciences, Series 4, Vol. XX, No. 9, pp. 291-465, March 3, 1932. Price $1. For sale by the Academy.

ON SOME FALSE SCORPIONS OF THE SUPERFAMILY CHEIRIDIOIDEA

(Arachnida, Chelonethida)

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The following report is designed to consider the material available to me pertaining to the superfamily in question in the same synoptic way as has previously been done for the suborders Heterosphyronida and Diplosphyronida and for the families of the Monosphyronida as a whole to which the present group pertains. The terminology employed is that previously elucidated and illustrated by the writer (Chamberlin, 1929, 1930 and 1931).

Superfamily CHEIRIDIOIDEA Chamberlin

Family PSEUDOCHEIRIDIIDÆ Chamberlin

Remarks. Includes only the type genus.

Genus PSEUDOCHEIRIDIUM With

1906. ***Pseudocheiridium.*** With, pp. 199-201.

Remarks. The three species at present pertaining to this genus may be separated by means of the following key (based upon the literature only). The species *träghårdi* of Tullgren may possibly represent a distinct genus.

1. Femur 3.0 times longer than broad; hand subequal to, or slightly shorter than the fingers; from South Africa..... .....*träghårdi* Tullgren (1907, p. 225)
   Femur 2.6 times longer than broad; hand distinctly much longer than fingers (1.4 to 1.5 times); from Asiatic region..... 2
2. Median transverse groove of carapace recurved; posterior process or heel of trochanter rounded; hand 1.6 times longer than broad; from the Nicobars.....*thorelli* With (1906, p. 200)
   Median transverse groove of carapace straight; heel of trochanter triangular and pointed; hand 1.9 times longer than broad; from Burma.....*clavigerum* Thorell (1889, p. 591)

Family CHEIRIDIIDÆ Chamberlin

Genus CHEIRIDIUM Menge

CHEIRIDIUM MUSEORUM (Leach)

Material examined. One ♂ (JC-609.01001) labeled simply "trouve sur un Polycaon. Chilien ? (15502)." Collections of the Paris Museum.

Genus Cryptocheiridium Chamberlin

Remarks. The two species referred to this genus by Chamberlin (1931) may be separated by means of the following key (based on the literature).

1. Coxæ of legs IV laterally indented; first six tergites with marginal teeth; from South Africa ..... *subtropicum* (Tullgren) (1907, p. 218)
   Coxæ of legs IV not laterally indented; first five tergites with marginal teeth; from Formosa ..... *formosanum* (Ellingsen) (1912, p. 123)

Genus Apocheiridium Chamberlin

Remarks. This group now includes some six species which may be separated by means of the following key. The addition of a species from the Philippine Islands adds greatly to the already large geographical territory ranged by members of this genus.

1. Chela not more than five times as long as width of tibia, generally considerably less; tibia at most not more than 3.2 or 3.3 times as long as broad 2
   Chela about 5.5 times as long as width of tibia; tibia 3.6 times as long as greatest breadth (♂, 1.35 mm. long; from Utah and Idaho) ..... *mormon* Chamberlin
2. Chela about 3.6 to 3.7 times as long as tibial breadth; palps smoothly granulate, with no larger tubercles except for 2-3 on the femoral angle; tibia 2.5 times as long as broad; from the Philippine Islands ..... *eruditum* sp. nov.
   Chela at least 4.5 times as long as tibial breadth; palps with at least a few larger granules aside from those occurring on the femoral angle; tibia 2.7 or more times as long as broad 3
3. Tibia 3.1-3.2 times as long as broad; trochanter about 1.7 times as long as broad; palps with larger granules either relatively small and inconspicuous or else moderately prominent but sparse 4
   Tibia 2.7-3.0 times as long as broad; trochanter 1.4-1.5 times as long as broad; palps everywhere thickly beset by large tooth-like granules 5
4. Femur 3.8-3.9 times as long as broad; chela 4.5-4.6 times as long as tibial breadth; from South Africa ..... *chamberlini* Godfrey
   Femur 4.3-4.4 times as long as broad; chela 4.8-4.9 times as long as tibial breadth; from southern California ..... *inexpectum* sp. nov.
5. Femur 3.7-3.8 times as long as broad; tibia three times as long as broad; chela 3.1-3.2 times as long as broad; length 1.4-1.6 mm.; from California ..... *ferumoides* Chamberlin
   Femur 4.1 times as long as broad; tibia 2.7 times as long as broad; chela 3.5 times as long as broad; length about 1.0-1.1 mm.; from France ..... *ferum* (Simon)

APOCHEIRIDIUM FERUMOIDES Chamberlin

Remarks. In addition to material previously recorded I have at hand a collection of 125 specimens of this species taken at Atherton, California (JC-391.03 and 713.01). Some cast skins (JC-401.02001-4) taken from moulting nests under the bark of a decaying log of white oak (*Quercus lobata*) near Lakeport, California, apparently also represent this species.

It is probable that the specimen from Mulegé, Lower California, previously noted (Chamberlin, 1924, p. 35) under this species, more likely pertains to *A. inexpectum* sp. nov. (q. v.).

APOCHEIRIDIUM CHAMBERLINI Godfrey

1924. *Apocheiridium* unnamed sp. nov. Chamberlin, pp. 35 and 37.
1927. *Apocheiridium chamberlini* Godfrey, p. 17.

Remarks. This South African species was given its name by Godfrey in a passing reference to the description by Chamberlin (t. c.). It is easily separable from the other members of the genus by the characters noted in the key.

Apocheiridium eruditum sp. nov.

Holotype, ♀ (JC-545.01001). Collected by Dr. C. F. Baker "among papers" at Los Baños, Luzon, Philippine Islands. Stanford University collections.

Diagnosis. Palps relatively stout, in general appearance quite similar to those of *A. ferumoides* but somewhat more robust; chela turbinate but more greatly swollen interiorly than exteriorly; the posterior femoral angle scarcely as pronounced as in *ferumoides;* femur 3.5-3.6 times as long as broad and 1.15 times as long as tibia; tibia 2.6 times as long as broad and nearly 1.4 times as long as hand; chela 2.9 times as long as broad; fingers perhaps slightly longer but very close to the same length as the hand; femur with a gentle but distinct concavity distally and proximally on its anterior contour; palps evenly granulate and almost totally (except for two or three on the femoral angle) without the larger tooth-like granules so characteristic of *ferumoides, ferum* and *mormon.* Small species, the ♀ measuring 0.95 mm.

Remarks. This small species seems most nearly related to *chamberlini* of South Africa, but differs in the distinctly more robust palps. This is the smallest representative of the genus thus far known and indeed is one of the smallest of all false scorpions.

Apocheiridium inexpectum sp. nov.

Holotype, ♂ (JC-548.01001); allotype ♀ (JC-548.01002); paratopotypes 60 ♂, ♀ and ⊙ (JC-548.01003-62) all taken

from under the bark of *Eucalyptus globulus* (Blue Gum) at Beaumont, Riverside County, California. Collected by the author, November 11, 1925. Paratypes, 58 ♂, ♀ and ☺ (JC-546.01001-58) taken under the bark flakes of sycamore trees near the Citrus Experiment Station (Box Springs Grade) Riverside, California. Collected by the author, November 20, 1925.

Additional material. Some cast skins (JC-534.01001-7) taken by the author from moulting nests under mesquite bark between Palm Springs and Indio, California, April 5, 1925, probably pertain to this species as does a single immature specimen presumably collected at Mulegé, Lower California, and previously recorded under *A. ferumoides* (Chamberlin, 1924, p. 35).

Diagnosis. A markedly smaller species than either *ferumoides* or *mormon*, the only other western American representatives of the genus thus far known. It reaches a length of 0.9-1.1 mm. as compared with the 1.4-1.6 mm. for the latter two species. Palps distinctly more slender than in *ferumoides*, but plainly stouter than in *mormon;* trochanter 1.7 times as long as broad; femur 3.8-3.9 times as long as broad; tibia 3.2 times as long as broad; chela 3.5 times as long as broad; hand and fingers nearly equal in length; chela 4.8-4.9 times as long as breadth of tibia; tibia 2.7-2.8 times as long as breadth of trochanter. The chela, unlike the case with either *mormon* or *ferumoides*, is markedly more swollen interiorly than exteriorly, a characteristic in which it agrees with *chamberlini* and *eruditum;* the palps are granulate, with fairly numerous but relatively inconspicuous larger granules, in which feature again it differs from *ferum*, *ferumoides*, and *mormon*. The general appearance is thoroughly typical of the genus.

Remarks. When originally collected this species was thought to be *ferumoides* and its specific distinctness was only recognized much later.

Family Sternophoridæ Chamberlin
Genus Sternophorus Chamberlin

Remarks. Of the four species here recorded, only *simi*, the genotype, has thus far been described. These four species, in spite of their large and discontinuous distribution, are so extremely close in superficial morphological structure that it is difficult to find characters that are sufficiently marked to permit their easy separation. The following key includes most of the important taxonomic criteria thus far ascertained.

The term "heel" of the trochanter requires some clarification. It is employed herein to mean the posterior protuberance of the trochanter which, in members of this genus, is often pronouncedly elongate and with a straight or nearly straight posterior contour. Its length is measured from the pedicel at the point where the swelling of the heel begins to the trochantero-femoral condyle.

1. Hand 2.8 times as long as tibial breadth; femur 3.0 times as long as broad; tibia 2.8 times as long as broad; fourth pedal tibia 3.5 times as long as broad; heel of trochanter nearly twice as long as breadth of chela; large species from the west coast of Mexico, the male measuring 3.7 mm. long..... .....*ferrisi* sp. nov.

   Hand 2.3 or less times as long as tibial breadth; femur 2.8 or less times as long as broad; tibia 2.3 or less times as long as broad; fourth pedal tibia 3.2 or less times as long as broad; heel of trochanter subequal to or less than breadth of chela in length; smaller species only rare individuals (occasional females of *sini*) attaining a length greater than 2.5 mm..... 2

2. Chela about three times as long as broad; femur 2.3 times as long as broad; tibia 2.5 times as long as heel of trochanter, which is much shorter than the breadth of the chela (about 0.7 as long); Australian species, the male measuring about 1.9 mm. long.....*hirsti* sp. nov.

   Chela plainly more than three times as long as broad, generally 3.4-3.6 times as great; femur 2.5-2.8 times as long as broad; tibia 2.0 or less times as long as the heel of the trochanter; heel of trochanter subequal in length to breadth of chela, never more than slightly greater or smaller; North American species 3

3. Heel of trochanter 1.1 or less times as long as breadth of femur; femur slightly but distinctly broader than tibia; chela about four times as long as broad (male); fourth pedal tibia 2.6 times as long as broad; median cribriform plates of female smoothly ovate and no larger or more conspicuous than the anterior spiracular guard sclerites; palpal femur strongly swollen basally, subequal in breadth to that of chela; small species (expanded male 1.7 mm., female barely 2.0 mm.), from southeastern United States.....*paludis* sp. nov.

   Heel of trochanter 1.3 times as long as breadth of femur; femur and tibia subequal in breadth; chela 3.5-3.6 times as long as broad; fourth pedal tibia 3.0 to 3.2 times as long as broad; median cribriform plates of female conspicuous, larger than guard sclerites of anterior spiracles and provided at either end of their major axis with a prominent sclerotic spur; palpal femur less swollen basally than in *paludis*, plainly

narrower than chela; larger species, expanded female specimens measuring 2.5-3.5 mm. long; from the region of the Gulf of California.....*sini* Chamberlin

STERNOPHORUS SINI Chamberlin

Material examined. Owing to an editorial oversight, the only locality recorded for this species in the original description (Chamberlin, 1923, p. 371) was the type locality. The following localities (all in Mexico) were actually represented by one or more specimens at the time. All collections were by the author. No additional material has since come to hand.

Sonora: San Carlos Bay (JC-687.02); San Pedro Bay (JC-177.02).

Islands of the Gulf of California: Angel de la Guardia, (Palm Canyon) (JC-167.02); Carmen Island, (Puerto Bellandra) (JC-130.03), Marquer Bay (JC-156.03); San Josef Island, (Lagoon at north end) (JC-174.04); Tiburon Island, (Monument Point, type locality) (JC-183.02), (Willards Point) (JC-344.03); Espiritu Santo Island, (San Gabriel Bay) (JC-361.03).

Lower California: Los Angeles Bay, (Palm Wells) (JC-119.03); Puerto Escondido (JC-129.02); Concepcion Bay, (Coyote Bay) (JC-181.02), (Point Guadalupe) (JC-366.02); Point Santa Antonita (JC-367.02); San Evaristo Bay (JC-369.03); Los Animas Bay (JC-714.01); Cuesta Blanca, (near Loreto) (JC-144.02); Agua Verde Bay (JC-182.03).

Sternophorus paludis, sp. nov.

Holotype, ♂ (JC-725.01001), Alachua County, Florida. Collected March 30, 1925, by Prof. T. H. Hubbell. Allotype, ♀ (JC-43.02001), Okefinokee Swamp (Billy's Island), Georgia. Collected by Prof. C. R. Crosby. Cornell University collection.

Diagnosis. Very close to *sini* Chamberlin, but the palps are somewhat more robust. The points in which the palpal proportions differ have already been noted in the preceding key to the species. In addition it may be noted that in the male at least the anterior femoral margin shows a number of larger granules (not conspicuous) which do not occur in *sini.* The species, however, is most easily separated from *sini* by its small size and geographical range. The male genitalia is of the same type as occurs in *sini,* but differs in as yet unelucidated details. In the female the most important difference is found in the inconspicuous unspurred median cribriform

plates. The following palpal proportions are from the male (the allotype was treated *in toto* in caustic potash, and as a result the palpal form unfortunately became somewhat distorted). Trochanter 2.0 times as long as broad; femur 2.7 times as long as broad; tibia 2.4 times as long as broad; chela 4.0 times as long as broad; hand slightly longer than the fingers and subequal in length to the tibia. Length of fully expanded male 1.7 mm., female 2.0 mm.

Sternophorus ferrisi sp. nov.

Holotype ♂, (JC-275.01001), State of Michoacan, Mexico. Precise date and locality unknown. Collected under the bark of a tree by Prof. G. F. Ferris. I take pleasure in dedicating this splendid species to its discoverer.

Diagnosis. Although quite distinct from the other species of the genus, this form is nevertheless quite closely related to *sini*. The male genitalic structures differ, in details not yet entirely worked out, from *sini* and other species of the genus. The preceding key includes all the important discriminatory criteria yet ascertained. The large size and excessive elongation of the heel of the trochanter are perhaps the most distinctive features of this species. The following palpal proportions should be of supplementary value. Trochanter 2.1 times as long as broad; femur 3.0 times as long as broad; tibia 2.8 times as long as broad; chela 4.0 times as long as broad; hand distinctly longer than fingers and only slightly shorter than the tibia. The fully expanded male measures 3.7 mm. long.

Sternophorus hirsti sp. nov.

Holotype ♂, (JC-480.01001) collected by F. S. Hirst on the Barringun frontier between New South Wales and Queensland, Australia. I take pleasure in dedicating this fine species to its discoverer, Dr. F. S. Hirst.

Diagnosis. In spite of its great and apparently remarkable geographical discontinuity with other members of the genus, this species is yet very close to the American forms in most of its morphological details. All the important diagnostic criteria thus far ascertained are incorporated in the preceding key. Perhaps the most characteristic feature of the species lies in the unusual shortness of the heel of the trochanter as compared with that of the American species. The male genitalia seems to show some differences, but they are not especially marked. The following palpal proportions should be of supplementary value. Trochanter 1.8 times as long as broad; femur 2.3 times as long as broad; tibia 1.9-2.0 times as long as broad; chela 3.0 times as long as broad; fingers and hand subequal in length and somewhat shorter than the tibia. Small species, the fully expanded male measuring 1.9 mm. long.

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An Important Work on the Pseudoscorpions

The entomologist generally finds his own field so engrossing that he rarely has time to give much thought to the spiders. However, the order Chelonethida, or pseudoscorpions, seems almost like a connecting link between the spiders and insects and they often attract the attention of the entomologist. One of our younger workers, Dr. Joseph C. Chamberlin, developed an interest in this order while a student at Stanford University and has now become our leading American authority on the group. Recently he has given us an elaborate monographic paper, from both the morphological and systematic sides. In the systematic portion he keys down to the genera and gives us numerous excellent cuts, most if not all of which were drawn by Dr. Chamberlin. With this work in hand one should be able to place any pseudoscorpion in its correct genus. A full bibliography and index completes the work. It is listed above as the "Chamberlin, Joseph C., 1931" entry.—E. P. Van Duzee.